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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/608,761	06/30/2000	Klaus Binder	705649 US1 ML	2512

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EXAMINER	
SODERQUIST, ARLEN	

ART UNIT	PAPER NUMBER
1743	16

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

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Office Action Summary	Application No. 09/608,761	Applicant(s) Binder et al.
	Examiner Arlen Soderquist	Art Unit 1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Jan 24, 2003*.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above, claim(s) *15-17, 19, 20, 22, and 23* is/are withdrawn from consideration.

5) ☐ Claim(s) ______ is/are allowed.

6) ☒ Claim(s) *1-14, 18, and 21* is/are rejected.

7) ☐ Claim(s) ______ is/are objected to.

8) ☐ Claims ______ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on ______ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on ______ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All b) ☐ Some* c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ______.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). ______
4) ☐ Interview Summary (PTO-413) Paper No(s). ______
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims 1-14, 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haas (US 5,143,696) or Schmelz in view of Daudel, Kurzweil, D'Amico and Tsutsumi.

In the patent Haas teaches a sensor for selective determination of gases which includes an electric capacitor having a gas permeable zeolite layer between 2 and 500 micrometer thick and being composed of a dielectric crystalline structure with a crystal size from 0.1 micrometer to 80 micrometer and having primary pores resulting in an internal surface from 100 to 1500 m^2/g, the diameter of the pores being between 0.1 and 1.5 nm which corresponds at least in order to magnitude to the kinetic diameter of the molecules of the gas to be detected, so that these molecules penetrate deep into the layer and its pores thereby changing the dielectric constant of the layer. The background discusses how such sensors are used in automobile systems. Column 4 lines 38-48 teach a number of gases including ammonia which can be sensed in this manner. Haas does not teach the scope of materials or detection methods.

In the patent Schmelz teaches a sensor for determining the gradient of ammonia concentration in waste gases. The concentration of NH_3 is determined on the basis of conductivity in flue gas and exhaust gas streams to be contacted with catalysts, using sensors from TiO_2 and ≥1 of WO_3, MoO_3, V_2O_5, and $V_xMo_yO_{32-z}$ where $x+y \leq 12$, $x,y \geq 1$ and $z \leq 1$. Column

4 lines 25-42 teach that this is either the catalyst material or has the same properties as the catalyst material. Individual pairs of contacts are connected to supply leads and are disposed in the sensor material and optionally on the surface of the sensor material, for determining electrical conductivity of the sensor material between the contacts of the individual pairs of contacts. The background section discusses this in conjunction with using SCR catalysts. Figures 6-8 show a second embodiment for use in a vehicle and column 8, lines 5-13 teaches a sensor that can be screwed into a deNO_x (SCR) catalyst. Schmelz does not teach the scope of materials or detection methods.

In the patent Daudel teaches an exhaust gas aftertreatment device for internal combustion engines having a catalyzer for the selective catalytic reduction of oxides of nitrogen from exhaust gases of motor vehicle diesel engines, provides overstoichiometric supply of NH_3 or materials releasing NH_3. A first sensor records the NH_3 concentration contained in the exhaust gas and interrupts the supply of the NH_3 quantity when a specified upper threshold value is reached. A second sensor records the NH_3 adsorbed in the catalyzer, by way of which the NH_3 supply is resumed on reaching a specified lower threshold value. Alternatively, only one NH_3 sensor is provided in the exhaust gas aftertreatment device. The NH_3 concentration determined by this single sensor is compared, as the actual value, with a required value corresponding to a specified NH_3 concentration in order to form a correction signal which is used for triggering the metering appliance continuously connected into the gas phase.

In the abstract and paper Kurzweil teaches impedance of zeolite-based gas sensors. Changes in conductivity and capacitance of NaY- and NaPtY-zeolites allow concentrations of butane, ammonia and other gases to be determined by zeolite interdigital sensors. By impedance spectroscopy, hydrocarbon conversion can be separated from the effect of water, which appears in a different frequency range. NaY-zeolites show a moderate conductivity, which is due to the mobility of sodium and is influenced by the presence of gases adsorbed at the pore surfaces.

In the abstract and paper D'Amico describes an ammonia surface acoustic wave (SAW) gas detector. The device consists of a SAW delay line fabricated on a STX-SiO_2 substrate, whose propagation path is coated with a selectively sorbent Pt film. Absorption and desorption

of ammonia in the film, produce a change in the mass density and in the elastic properties of the film which, in turn, cause a change in the SAW phase velocity. The change in velocity causes a shift in the phase at the output of the line which can be detected as a frequency shift when the line is configured in a SAW oscillator. The response of the device was investigated vs. both ammonia gas concentration in N and temperature for different values of the film thickness. Finally the use of differential structures, to reduce the device sensitivity to temperature fluctuations was investigated and results discussed.

In the paper Tsutsumi teaches the direct measurement of interaction energy between solids and gases. The differential heat of adsorption of NH_3 on synthetic zeolites was calorimetrically measured through a thermoelectromotive force in the thermoelement (page 3576) and the distribution of the surface acidity was discussed in relation to the catalytic activity for cumene-cracking as a function of zeolite compositions. A newly designed apparatus, a twin-conduction-type calorimeter equipped with a semiconductor thermoelement and an adsorption apparatus, was used for the direct measurement of the differential heat of adsorption. The differential heat of adsorption of NH_3 decreased with the increase in surface coverage, the acid site on the surface becoming stronger up to 27 kcal/mole for NH_3-adsorption when the ratio of silica to alumina was higher and the content of exchanged ammonium ions was higher. The cumene-cracking reaction was effectively catalyzed by zeolites having such sites with heat of adsorption of NH_3 exceeding 25 kcal/mole.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the detection methods of Kurzweil, D'Amico and Tsutsumi into the methods taught by Haas or Schmelz because of their known ability to sense ammonia in the same types of environments taught by Haas and Schmelz. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple sensors as taught by Daudel or Schmelz because of the ability to monitor the process in many places and gain a better control of the processes as shown for the process of Daudel.

3. Applicant's arguments filed January 24, 2003 have been fully considered but they are not persuasive. Relative to the arguments, it appears that applicant has not read the Schmelz

reference in particular in which The concentration of NH_3 is determined on the basis of conductivity in flue gas and exhaust gas streams to be contacted with catalysts, using sensors from TiO_2 and ≥ 1 of WO_3, MoO_3, V_2O_5, and $V_xMo_yO_{32-z}$ where $x+y \leq 12$, $x,y \geq 1$ and $z \leq 1$. Column 4 lines 25-42 teach that this is either the catalyst material or has the same properties as the catalyst material. Also figures 6-8 of Schmelz show a second embodiment for use in a vehicle and column 8, lines 5-13 teach a sensor that can be screwed into a deNO$_x$ (SCR) catalyst. In addition to this claim 1 does not require any structure to place the material being sensed in an exhaust gas stream. Similar comments are appropriate for the Haas reference. Relative to the storage state of the catalyst the Daudel reference clearly shows haw the storage state can be determined through sensing the presence of ammonia at a plurality of location within the catalyst which would have clearly taught one of skill in the art how to determine the storage state with any other type of sensor capable of determining the presence of ammonia at various location in the catalyst. Additionally applicant is directed to the newly cited Ogawa reference which also clearly teaches a catalyst configuration that the catalyst load can be determined.

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional references are directed to measurement of ammonia gas concentration in systems using ammonia to reduce NO_x in exhaust gases.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose telephone number is (703) 308-3989. The examiner's schedule is variable between the hours of about 5:30 AM to about 5:00 PM on Monday through Thursday and alternate Fridays.

For communication by fax to the organization where this application or proceeding is assigned, (703) 305-7719 may be used for official, unofficial or draft papers. When using this number a call to alert the examiner would be appreciated. Numbers for faxing official papers are 703-872-9310 (before finals), 703-872-9311 (after-final), 703-305-7718, 703-305-5408 and 703-305-5433. The above fax numbers will generally allow the papers to be forwarded to the examiner in a timely manner.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Arlen Soderquist

ARLEN SODERQUIST
PRIMARY EXAMINER